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| 10/522,732 | 05/09/2005 | Gordon Leith Morriss | 2340-000375/US | 8835 |
| 30593 7590 05/12/2008 HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 8910 RESTON, VA 20195 | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/522,732

Applicant(s)

MORRIS ET AL.

Examiner

DNYANESH KASTURE

Art Unit

4147

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-43 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 28 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date 28 Jan 05, 16 Mar 07
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 31 is objected to because of the following informalities: the phrase
“..wherein the or each pump..” needs to be clarified. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claim 35 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention because it refers to itself as a dependant claim: “A pump according to claim 35 ..”

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 6-9, 33, 34, 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Caillaud (US Patent 2,971,465 A).

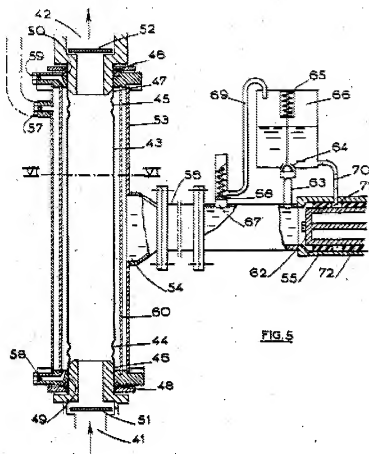


FIG. 5

6. In Re Claim 1, with reference to Figure 5 depicted above, Caillaud discloses a pump conveying pumped fluid from (41) to (42) using actuating fluid entering through (54) and (57) comprising:

- a rigid outer casing (53) defining an interior space
- a tube structure (43) accommodated in the interior space
- the tube structure being flexible and substantially inelastic:
 - Column 6, Lines 16-17 state: "This diaphragm includes advantageously a body of polyfluoroethylene.."
 - Column 3, Lines 45-46 state: "This diaphragm is made of

polytetrafluoroethylene of a comparatively low elasticity”

The diaphragm is disclosed as having low elasticity and is therefore substantially inelastic. In addition, a diaphragm by definition is flexible.

- the interior of the tube structure defining a pumping chamber (as depicted) for receiving pumped fluid – in this case oil
- the tube structure is movable between laterally expanded and collapsed positions (Column 6, Lines 74-75 and Column 7, Lines 5-12)
- tube structure is maintained taut between ends (48)
- the region of the interior space surrounding the tube structure defining an actuating region for receiving and accommodating actuating fluid - the piston (62) pushes the actuating fluid through (54) into the tubular region
- the pumping chamber receives pumping fluid through (41) and causes the diaphragm (43) to expand
- when the diaphragm (43) collapses in response to the drive fluid entering through (54), the pumped fluid is forced to exit through (42)

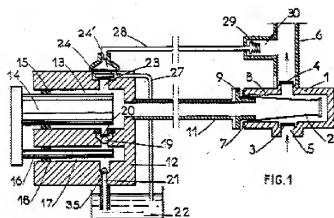
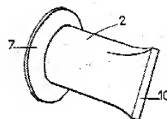


FIG. 1

FIG. 2



7. Alternatively, In Re claim 1, with reference to Figures 1 and 2 depicted above, Caillaud discloses a pump conveying pumped fluid from (5) to (6) using actuating fluid entering and leaving through (7) however, note that Column 8, Lines 24-30 state: "...it has been assumed that the driving liquid was contained inside the pocket-shaped diaphragm while liquid to be conveyed is carried outside the latter. It is obviously possible to provide the driving liquid on the outside of the diaphragm and the liquid to be conveyed inside the latter) comprising:

- a rigid outer casing (1) defining an interior space
- a tube structure (2) accommodated in the interior space
- the tube structure being flexible and substantially inelastic:
 - Column 3, Lines 45-46 state: "This diaphragm is made of polytetrafluoroethylene of a comparatively low elasticity"

The diaphragm is disclosed as having low elasticity and is therefore substantially inelastic. In addition, a diaphragm by definition is flexible.

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- the interior of the tube structure (2) defining a pumping chamber for receiving pumped fluid
- the tube structure is movable between laterally expanded and collapsed positions (Column 4, Lines 57-58)
- tube structure is maintained taut between ends (10) and (7)
- the region of the interior space surrounding the tube structure (8) defining an actuating region for receiving and accommodating actuating fluid
- the pumping chamber receives pumping fluid through (7) and causes the diaphragm (2) to expand
- when the diaphragm (2) collapses in response to the drive fluid entering through (5), the pumped fluid is forced to exit through (7)

8. In Re claim 2, the Alternate rejection with reference to Figures 1 and 2 of Caillaud discloses a tube structure (2) that is closed at (10) and open at (7).

9. In Re claim 3, the Alternate rejection with reference to Figures 1 and 2 of Caillaud discloses that the flange (7) is clamped at end (8) of the pump body (Column 3, Lines 39-40).

10. In Re claim 6, with reference to Figure 6, Caillaud depicts an annulus substantially surrounding the tube structure.

11. In Re claim 7, with reference to Figure 5, Caillaud depicts the annulus is in fluid communication with the fluid chamber by virtue of being in the actuating chamber.

12. In Re claim 8 and 9, with reference to Figure 5, Caillaud depicts exhaust port (59) to bleed air from the pump. During intake and exhaust strokes, entrapped air can accumulate in the actuating fluid between the flexible tube wall of the pumping chamber and the intermediate cylindrical wall (60). Entrapped air can also accumulate in the actuating fluid between the tubular wall (53) and the intermediate cylindrical wall (60). All entrapped air can be allowed to escape through (59) during either the intake or exhaust strokes by motive force from the pumping fluid or the pumped fluid.

13. In Re Claims 33 and 34, Caillaud as applied to claims 1 and 2 as discussed earlier discloses all the claimed limitations.

14. In Re claim 35, with reference to the alternate rejection of claim 1 discussed above, as depicted in Figures 1 and 2, Caillaud discloses the port (7) through which the fluid enters is opposite to (5) where the actuating fluid enters the pump.

15. Claims 1, 2, 4, 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Taga (US Patent 5,964,580 A)

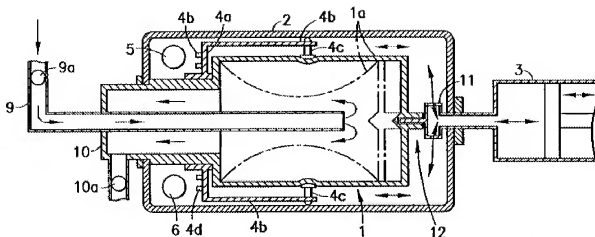


FIG.5

16. In Re claim 1, with reference to Figure 5 depicted above, Taga discloses a pump conveying pumped fluid from (9) to (10) using actuating fluid entering through (3) comprising:

- a rigid outer casing (2) defining an interior space
- a tube structure (1) accommodated in the interior space
- the tube structure being flexible and substantially inelastic, Column 1, Lines 32-34 state: "...diaphragm pumps, bellows pumps or the like whose major parts are made of polytetrafluoroethylene...". As discussed earlier, polytetrafluoroethylene has comparatively low elasticity
- the interior of the tube structure defining a pumping chamber (as depicted) for receiving pumped fluid (direction of single arrows)
- the tube structure is movable between laterally expanded and collapsed positions (as depicted by the dotted line and double sided arrows)
- tube structure is maintained taut between ends (12) and (4)

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- the region of the interior space surrounding the tube structure defining an actuating region for receiving and accommodating actuating fluid - the piston (3) pushes the actuating fluid through (11) into the tubular region
- the pumping chamber receives pumping fluid through (9) and causes the diaphragm (1) to expand
- when the diaphragm (1) collapses in response to the drive fluid entering through (11), the pumped fluid is forced to exit through (10)

17. In Re claim 2, Taga discloses that the end (12) is closed.

18. In Re claim 4, Taga discloses that the closed end (11) of tube (1) is movably supported because it can slide as depicted to accommodate the longitudinal extension and contraction of the tube structure.

19. In Re claim 5, Taga discloses arms (4b), (4c) that provide the cantilever spring force by spring action, providing additional support to the closed end.

Claim Rejections - 35 USC § 103

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. Claims 10, 11, 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taga (US Patent 5,964,580 A) and in view of Kitsnik (US Patent 4,439,112 A)

22. In Re claims 10, 11, 12 and 14 Taga as applied to claim 1 discloses all the claimed limitations except for the monitoring means to monitor the pump during the intake and discharge stroke, monitor the condition of the tube indirectly or directly at the closed end of the tube structure, and indicating when an intake/discharge stroke is completed.

23. However, Kitsnik discloses in Column 4, lines 64-68: "The diaphragms 18 and 19 are each provided in a house 23 and 24 in the diaphragms casing 17 and contact, in their outer end positions, indicators 25. Indicators 25 consist of a shaft 26 having a magnet 27 at one end and a plate 28 at the other". These indicators indicate the position of the diaphragm and therefore the status of the intake/exhaust stroke during operation and "indirectly" indicate the position of the closed end of the diaphragm (tube structure).

24. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate the indicators of Kitsnik into the cylindrical member structure of Taga for the purpose of determining the position of the diaphragm during operation as taught by Taga. The position of the diaphragm during operation is the key to determining whether a failure has occurred

25. Alternatively, In Re claims 10, 11 and 12, Taga discloses in Column 2, Lines 4-11:

"..stress cracking is liable to occur due to mechanical fatigue of their materials caused by repetitive bending motion and concentration of a high stress, and this can damage the pumps. To cope with the problem, conventional pumps are equipped with a leakage sensor for detecting leakage of a subject liquid..". A leakage sensor would "monitor" the condition of the tube structure including the position of the closed end or any other part of the tube with respect to the position of the leak.

26. Claims 10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caillaud (US Patent 2,971,465 A) and in view of Eull (US Patent 3,427,987 A)

27. In Re claim 10 and 13, Caillaud as applied to Claim 1 discloses all the claimed limitations except monitoring means to monitor the pressure differential between components of the pump.

28. However, Eull discloses a valve adjacent to the inlet and outlet (Column 2, Lines 5-6) that "monitors" the pressure and vents the pressure in a chamber if it is too high.

29. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate the valve of Eull into the apparatus of Caillaud for the purpose of safety of the pump components (including the diaphragm) by keeping them from being exposed to unnecessarily high pressures.

30. Claims 15 - 20, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caillaud (US Patent 2,971,465 A) and in view of Voelker (US Patent 3,250,226 A)

31. In Re claim 15, Caillaud as applied to claim 1 discloses all the claimed limitations except for the timing of the delivery of pumped fluid and actuating fluid as set forth in the claim.

32. However, Voelker discloses operation of hydraulic pumps where the operation is effected by a timer (74) as stated in Column 3, Lines 1-3.

33. It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the apparatus of Caillaud to incorporate the solenoid valves and timer as taught by Voelker for a more precise operation of the pump.

34. In Re claim 16, Caillaud discloses a delivery pump (12).

35. In Re claim 17 and 18, Caillaud discloses oil as the actuating fluid (Column 6, lines 37-38).

36. In Re claim 19, Caillaud discloses a hydraulic circuit incorporating a reservoir (22) and a hydraulic pump (12).

37. In Re claim 20, Caillaud discloses a pumping system (12) with an intake valve (19) and an exit valve (26) for regulating delivery. Voelker teaches a timer that controls the opening and closing of the valves.

38. In Re claim 23, with reference to the alternate rejection of claim 1 discussed above, as depicted in Figure 1, Caillaud discloses that delivery of the actuating fluid at (5) into the actuating region is opposite the end (7) where pumped fluid enters and discharges from the pumping chamber (2).

39. In Re claim 24, with reference to the alternate rejection of claim 1 discussed above, as depicted in Figure 1, Caillaud discloses that outlet of the actuating fluid at (4) from the actuating region is opposite the end (7) where pumped fluid enters and discharges from the pumping chamber (2).

40. Claims 17, 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caillaud (US Patent 2,971,465 A) in view of Voelker (US Patent 3,250,226 A) and further in view of Taga (US Patent 5,964,580 A)

41. In Re claim 17 and 21, Caillaud and Voelker as applied to claim 15 discloses all the claimed limitations except for the actuating fluid being water.

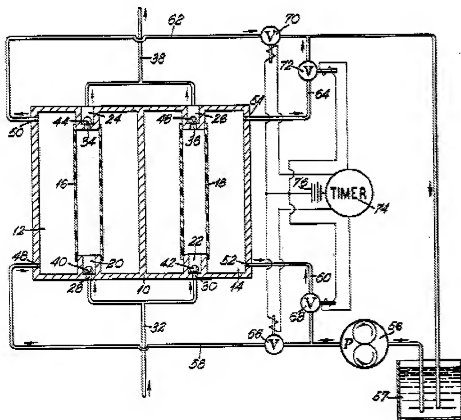
42. However, Taga discloses in Column 5 lines 43-44: "hydraulic fluid, e.g. silicone oil, fluorine oil, pure water, or the like, supplied from the pressurizing means".

43. It would have been obvious to a person having ordinary skill in the art at the time of the invention to use water as the driving fluid as taught by Taga instead of oil as the driving fluid in the apparatus of Caillaud modified by Voelker as an alternate actuating means to pump the driven fluid.

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44. In Re claim 22, Figure 5 of Caillaud discloses a reservoir (66) at an elevated location.

45. Claims 1, 15, 25, 26, 28 - 32, 36 - 39 and 41 - 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voelker (US Patent 3,250,226 A) and in view of Caillaud (US Patent 2,971,465 A)



46. In Re claims 1 and 15, with reference to the above Figure, Voelker discloses a pump conveying pumped fluid from (32) to (38) using actuating fluid entering through (48) and (52) into two pumping chamber comprising:

- a rigid outer casing (10) defining two interior spaces
- a tube structure (16) and (18) for the two pumps in the interior space
- the interior of the tube structure defining a pumping chamber (as depicted) for receiving pumped fluid – in this case oil
- the tube structure is movable between laterally expanded and collapsed positions (Column 1, Lines 61-62)
- tube structure is maintained taut between ends (20) and (24) for the first pump and between (22) and (26) for the second pump
- the region of the interior space surrounding the tube structure defining an actuating region for receiving and accommodating actuating fluid - the pump (56) pushes the actuating fluid into the tubular region
- the pumping chamber receives pumping fluid through (20) and (22) and causes the diaphragm (16) and (18) to expand
- the pumping chamber receives pumping fluid through (20) and (22) and causes the diaphragm (16) and (18) to expand
- when the diaphragm (16) and (18) collapses in response to the drive fluid entering through (48) and (52), the pumped fluid is forced to exit through (24) and (26)
- the tube structure is flexible (collapsible as disclosed in Column 1, Line 54)

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- a timer (74) for timed delivery of pumping fluid to the actuating chamber and pumped fluid to the pumping chamber

47. However, Voelker does not disclose that the tube structures (16) and (18) are substantially inelastic

48. Nevertheless, Caillaud discloses the tube structure being flexible and substantially inelastic:

- Column 3, Lines 45-46 state: "This diaphragm is made of polytetrafluoroethylene of a comparatively low elasticity"

The diaphragm is disclosed as having low elasticity and is therefore substantially inelastic.

49. It would have been obvious to a person having ordinary skill in the art at the time of the invention to select polytetrafluoroethylene of a comparatively low elasticity as taught by Caillaud for the tubing material of the tube structure of Voelker as an alternate choice for material instead of polyethylene disclosed by Voelker in Column 1, Lines 57-60: "Collapsible tubes 16 and 18 can be made of polyethylene or any other suitable material capable of withstanding repeated flexure without rupturing".

50. In Re claim 25, Voelker discloses in Column 3, Lines 22-25 that collapsible tube (18) is expanded when collapsible tube (16) is contracted.

51. In Re claim 26, Voelker discloses in Column 3, Line 47 that the flow of pumped fluid is at a substantially constant volumetric rate.

52. In Re claim 28 and 29, Voelker discloses in Column 2, Lines 66-67: "...constant output hydraulic pump 56...". In transition when one diaphragm pump completes the discharge stroke the other diaphragm pump would have to start its discharge stroke to sustain the constant output of pump since working fluids are generally incompressible. Consequently, the other diaphragm pump will be at full discharge flow before the first diaphragm fully completes its discharge.

53. In Re claim 30, Voelker discloses the two pumps have common delivery means (32) and common supply means (58) with appropriate valves (40, 42, 56, 68).

54. In Re claim 31, Caillaud discloses the diaphragm pump (16) is closed by valve (46) at the top and therefore the closed end of tube structure (16) is elevated in relation to the other open end during the intake stroke. Similarly the diaphragm pump (18) is closed by valve (46) at the top and therefore the closed end of tube structure (18) is elevated in relation to the other open end during the intake stroke. Voelker and Caillaud as applied to claim 25 discloses all the remaining claimed limitations of claim 31.

55. In Re claim 32, with reference to the Alternate rejection of Claim (1), Caillaud discloses that delivery (5) and exit (4) of the actuating fluid are adjacent to the closed end (10). Voelker and Caillaud as applied to claim 25 discloses all the remaining claimed limitations of claim 32.

56. In Re claim 36, Voelker and Caillaud as applied to claim 26 as discussed above discloses all the claimed limitations.

57. in Re claim 37, Caillaud as applied to claim 1 as discussed earlier discloses a flexible and inelastic tube structure. Voelker and Caillaud as applied to claim 26 discloses all the remaining limitations of claim 37.

58. In Re claim 38, with reference to the Alternate rejection of Claim (1), as discussed earlier, Caillaud discloses a pumping chamber closed at one end (10) and other end connected to a port (7). Voelker and Caillaud as applied to claim 36 discloses all the remaining limitations of claim 37.

59. In Re claim 39 and 41, Voelker and Caillaud as applied to claim 31 discloses all the claimed limitations.

60. In Re claim 42, with reference to the Alternate rejection of Claim (1), Caillaud discloses that delivery (5) and exit (4) of the actuating fluid are adjacent to the closed end (10). Voelker and Caillaud as applied to claim 41 discloses all the remaining limitations of claim 42.

61. In Re claim 43, Caillaud as applied to claim 1 as discussed earlier discloses a flexible and inelastic tube structure. Voelker and Caillaud as applied to claim 41 discloses all the remaining limitations of claim 43.

62. Claims 27 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voelker (US Patent 3,250,226 A) in view of Caillaud (US Patent 2,971,465 A) and further in view of Kahr et al (US Patent 2,027,104 A)

63. In Re claim 27, Voelker and Caillaud as applied to claim 25 discloses all the claimed limitations except for the duration of the discharge stroke is longer than the intake stroke.

64. However, Kahr et al discloses on page 8, second column, Lines 3-10: " hydraulic device for oil well pumping, a cylinder provided with a reciprocating piston, a variable capacity pump for delivering fluid to the cylinder to actuate the piston, and means synchronized with the pump for controlling the discharge therefrom and for imparting to the, piston a working stroke of variable velocity and of longer duration than the return stroke"

65. It would have been obvious to a person having ordinary skill in the art at the time of the invention to substitute the piston pump and method of operating the pump with a longer working stroke than the return stroke as taught by Kahr et al into the apparatus of Voelker modified by Caillaud for the purpose of improved readiness for the compression

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stroke (discharge) following the quick expansion (compression) stroke by allowing for the settling of transient fluid activity.

66. In Re claim 40, Voelker, Caillaud and Kahr et al as applied to claim 27 discloses all the claimed limitations. MPEP 2112.02 states "Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device" .

Conclusion

67. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cerveny (US Patent 3,087,433 A) and Vincent et al (US Patent 3,253,549 A) disclose other diaphragm pumps.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DNYANESH KASTURE whose telephone number is (571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, George Nguyen can be reached on (571) 272-4491. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
Unit 3683

DGK